U.S. Department of Energy
and the
National Science Foundation

FEB 18 2005

Professor Frederick Gilman
Carnegie Mellon University
5000 Forbes Avenue
Pittsburgh, Pennsylvania 15213

Dear Dr. Gilman:

This letter is to request that the High Energy Physics Advisory Panel (HEPAP), in cooperation with the Astronomy and Astrophysics Advisory Committee (AAAC) of NSF and NASA, establish a Dark Energy Task Force as a joint sub-committee to advise NSF, NASA and DOE on the future of dark energy research.

Background and Purpose

The NRC Report *Connecting Quarks with the Cosmos*[1] poses eleven science questions for the new century, among which the nature of dark energy is identified as "probably the most vexing." The report outlines a near-term program to constrain the properties of dark energy, which includes the measurement of the apparent brightness of Type Ia supernovae as a function of redshift, the study of the number density of galaxies and clusters of galaxies as a function of redshift, and the use of weak gravitational lensing to study the growth of structure in the universe. The report also recommends the construction of two wide-field telescopes, one in space and one on the ground, to measure much larger numbers of supernovae with control of systematics and to map gravitational lensing over large scales.

In response, an NSTC interagency working group has established a federal strategy for approaching the dark energy question (see *The Physics of the Universe*[2]). The recommended triple-pronged strategy covers measurements of weak lensing, Type Ia supernovae and studies of the Sunyaev-Zel'dovich effect, primarily through a ground-based large survey telescope (LST), a space-based Joint Dark Energy Mission (JDEM) and coordinated ground-based CMB and space-based X-ray observations of galaxy clusters.

The joint Dark Energy Task Force (DETF) will help the agencies to identify actions that will optimize a near- and intermediate-term dark energy program and ensure rapid progress in the development and implementation of a concerted effort towards understanding the nature of dark energy.

Charge to the Task Force

The DETF is asked to advise the agencies on the optimum near- and intermediate-term programs to investigate dark energy and, in cooperation with agency efforts, to advance the justification, specification and optimization of LST and JDEM.

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[1] http://www.nap.edu/books/0309074061/html/
[2] www.ostp.gov/html/physicsoftheuniverse2.pdf

The DETF is asked to address the following areas:

1. Summarize the existing program of funded projects by projected capabilities, systematics, risks, required developments and progress-to-date.

2. Where possible, similarly summarize proposed and emergent approaches and techniques for dark energy studies; that is, characterize these approaches and techniques by the added value the projected capabilities would provide to the investigation of dark energy.

3. Identify important steps, precursors, R&D and other projects that are required in preparation for JDEM, LST and other existing or planned experiments.

4. If possible, identify any areas of dark energy parameter space that the existing or proposed projects fail to address.

The DETF is not constituted, nor has available time, to review individual proposals to determine their technical feasibility or likelihood of meeting performance goals. Rather, in addressing the areas above the DETF is asked to advise on the coverage of parameter space, to identify potential knowledge gaps that would preclude informed decisions about projects, to identify unnecessary or duplicated efforts, and to quantify the sensitivity of the determination of dark energy parameters to experimental performance goals such as sky coverage, number of objects, image quality or other requirements. The DETF should also comment on areas where expanded theoretical or modeling activity would be of significant benefit.

Reporting

The DETF Chair is responsible for preparing the final report, in consultation with all DETF members. In accordance with FACA rules, this report will be discussed independently at the first meetings of the AAAC and the HEPAP following completion of the report, before formal presentation to the agencies. We request that the DETF prepare their report for submission to the committees with a target date of December 2005.

We thank you for your efforts and wish you success in this important endeavor.

Sincerely,

Robin Staffin
Associate Director, Office of High Energy Physics
Office of Science
U.S. Department of Energy

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